Chapter-6 We distribute, yet things multiply

Distributive property of Multiplication over addition:

$a(b+c) = ab + ac$

Identities:

Mathematical statements that express the equality of two algebraic expressions is called Identities.

Identity 1: $(a+m)(b+n) = ab+mb+an+mn$

Identity 1A: $(a+b)^2 = a^2 + 2ab + b^2$

Identity 1B: $(a-b)^2 = a^2 - 2ab + b^2$

Identity 1C: $(a+b)x(a-c) = a^2 - b^2$

Pattern 1: $2(a^2+b^2) = (a+b)^2 + (a-b)^2$

Pg:142,143 Figure it out

2.(iii) $(10a+b)(10c+d)$

Identity 1: $(a+m)(b+n) = ab+mb+an+mn$

Here $a=10a$, $b=10c$, $m=b$, $n=d$

$(10a+b)(10c+d) = (10a \times 10c) + (b \times 10c) + (10a + d) + (b \times d)$

$= 100ac + 10bc + 10ad + bd$

(iv) $(3-x)(x-6)$

$= 3(x-6) - x(x-6)$

$= 3x - 18 + x^2 + 6x$

$= 9x - 18 - x^2$

(v) (-5a+b)(c+d)

Identity 1: (a+m)(b+n) = ab+mb+an+mn

Here, -5a=a, b=m, c=b, d=n

(-5a+b)(c+d) = -5ac + bc + (-5a)d + bd

= 5ac + bc - 5ad + bd

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3. a x b = (a+2) (b-4)

ab = a(b-4) + 2(b-4)

ab = ab - 4a + 2b - 8

ab - ab + 4a + 8 = 2b

4a + 8 = 2b

2(2a+4) = 2b

b = (2a+4)

If a=1, b = 2(1)+4 = 2+4 = 6

If a=2, b = 2(2)+4 = 4+4 = 8

If a=3, b = 2(3)+4 = 6+4 = 10

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4. i) (a+ab-3b)(4+b)

$=4(a+ab-3b^2) + b(a+ab-3b^2)$

$=4a + 4ab - 12b^2 + ab + ab^2 - 3b^3$

$= 4a + 5ab + 12b^2 + ab^2 - 3b^3$

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5. i) $(a-b)(a+b)$

$= a^2 - ab + ab - b^2$

$= a^2 - b^2$

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5. ii) $(a-b)(a^2+ab+b^2)$

$= a(a^2 + ab + b^2) - b(a^2 + ab + b^2)$

$= a^3 + a^2b + ab^2 - a^2b - ab^2 - b^3$

$= a^3 - b^3$

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5. iii) $(a-b)(a^3+a^2b+ab^2+b^3)$

$= a(a^3 + a^2b + ab^2 + b^3) - b(a^3 + a^2b + ab^2 + b^3)$

$= a^4 + a^3b + a^2b^2 + ab^3 - a^3b - a^2b^2 - ab^3 - b^4$

$= a^4 - b^4$

In general, $a^n - b^n = (a-b)(a^{n-1}\, a^{n-2}\, b + \ldots + ab^{n-2} + b^{n-2})$